

What is Claimed is:

1. A method for inhibiting clathrate hydrate plug formation in a conduit or machinery comprising adding to the 5 conduit or machinery an antifreeze protein, an active fragment of the antifreeze protein or a mimetic of the antifreeze protein or active fragment thereof.

10 2. The method of claim 1 wherein the antifreeze protein contains or forms a  $\beta$ -helix or  $\beta$ -helices, a  $\beta$ -roll, a glycoprotein or a globular structure.

15 3. The method of claim 1 wherein the antifreeze protein or active fragment is derived from an insect, plant, fungi, protist or bacteria.

20 4. The method of claim 1 wherein the antifreeze protein or active fragment is derived from an insect or plant.

25 5. A method for decreasing the rate at which clathrate hydrates reform in a conduit or machinery comprising adding to the conduit or machinery an antifreeze protein, an active fragment of the antifreeze protein or a mimetic of the antifreeze protein or active fragment thereof.

30 6. The method of claim 5 wherein the antifreeze protein contains or forms a  $\beta$ -helix or  $\beta$ -helices, a  $\beta$ -roll, a glycoprotein, or a globular structure.

7. The method of claim 5 wherein the antifreeze protein or active fragment is derived from an insect, plant, fungi, protist or bacteria.

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8. The method of claim 5 wherein the antifreeze protein or active fragment is derived from an insect or plant.

5 9. The method of claim 5 further comprising addition of a second, different inhibitor of clathrate hydrate formation to the conduit or machinery.

10 10. The method of claim 1 or 5 wherein the conduit or machinery is a pipeline in oil drilling and exploration or transport.

11. The method of claim 1 or 5 wherein the conduit or machinery is used in a bacterial fermentation process.

15 12. The method of claim 1 or 5 wherein the conduit or machinery is used in disposal of CO<sub>2</sub> containing waste products.

20 13. A method for designing and selecting clathrate hydrate inhibitors comprising comparing a test compound's ability to inhibit clathrate formation or reformation to the ability of an antifreeze protein containing or forming a  $\beta$  helix or  $\beta$ -helices, an  $\alpha$ -helix, a  $\beta$ -roll, a glycoprotein, or 25 a globular structure, or an active fragment of the antifreeze protein to inhibit clathrate hydrate formation or reformation wherein similar or enhanced ability of the test compound to inhibit clathrate hydrate formation or reformation as compared to the antifreeze protein or active 30 fragment thereof is a indicative of the test compound being a clathrate hydrate inhibitor.

35 14. A method for inhibiting clathrate hydrate plug formation and/or decreasing the rate of clathrate hydrate plug reformation in the production, storage and transport of

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hydrocarbons comprising adding to the hydrocarbons an antifreeze protein, an active fragment of the antifreeze protein, or a mimetic of the antifreeze protein or active fragment thereof in an aqueous solution.

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15. The method of claim 14 wherein the antifreeze protein contains or forms a  $\beta$ -helix or  $\beta$ -helices, a  $\beta$ -roll, a glycoprotein, or a globular structure.

10 16. The method of claim 14 wherein the rate of clathrate hydrate plug reformation in the production, storage and transport of hydrocarbons is decreased by inhibition of memory effect.

15 17. The method of claim 16 wherein the antifreeze protein contains or forms a  $\beta$ -helix or  $\beta$ -helices, a  $\beta$ -roll, a glycoprotein, a globular structure or an  $\alpha$ -helix.

20 18. A composition for inhibiting clathrate hydrate formation or decreasing rate of reformation of clathrate hydrates comprising an antifreeze protein, an active fragment of the antifreeze protein, or a mimetic of the antifreeze protein or active fragment thereof in an aqueous solution.

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19. The composition of claim 18 wherein the antifreeze protein contains or forms a  $\beta$  helix or  $\beta$ -helices, a  $\beta$ -roll, a glycoprotein, or a globular structure.

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20. The composition of claim 18 further comprising a second, different inhibitor of clathrate hydrate formation.